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In This Issue...

Client Feature
pages 1-2

Focus - Hay Handling
page 3

AT Notes
pages 4-5

State Project Feature -
Kentucky AgrAbility
Project
pages 6-7

References
page 8

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Incident Makes Kentucky Farmer Think Twice About Safety

It had been a wet spring making haying nearly impossible. The weather was nice so he was busy trying to catch up. He was in a hurry. On a Saturday evening in May of 2003, Allen was making round bales to feed his livestock. The belts on the new round baler became misaligned on the rollers. After repeated attempts to fix them, he climbed on top of the baler with the engine running and tried to realign the belts. He says he should have known better. But he was in a hurry. His right hand got caught and then his left. He couldn't pull them out. He had to wait an hour for his son to return so the tractor could be turned off and his hands released. A cell phone call to 911 ended with a med flight to a Louisville Kentucky Hand Center. He lost both hands that evening.



Allen Hicks driving his tractor on his Elizabethtown, Kentucky farm.

Allen Hicks of Elizabethtown, Kentucky, continues to operate his 50 head cattle farm. He sells square baled hay to horse ranchers locally and out of state. During the day he works as office manager for a car dealership, a job he has held for 18 years. His full time agricultural operation is done on evenings and weekends. Allen was out of the hospital on Thursday following his injury and working at the dealership on Friday. A week later he was supervising the haying operation on his ranch. Not long after that he was back haying himself.

Allen makes 50 lb square bales with his Hoelscher accumulator. The bales are 14" x 18" x 36" and stack easily. He uses a tractor loader to place bales on a wagon and then stacks them in his barn until they are sold.

Continued on page 2

Client Feature

Allen is able to handle the whole haying process from field to barn to market or feed. This has been accomplished through a combination of modifications to his equipment and the willing help of friends and neighbors. In order to enter the tractor cab and start the engine, Allen has to push small buttons. Since pushing the buttons has been problematic, a neighbor offers him the assistance needed to get in and start the tractor. He is able to push the inside cab door lever to get out of the tractor.

Another obstacle had been the joy stick on his loader, which also required a release button to be pushed and both hands to move into position. He bypassed the joy stick by rerouting the hydraulic hoses to the back of the loader. The plug-ins in the back are operated by levers inside the cab. He steers and handles the levers with his elbows.

Allen and John Hancock from AgrAbility Kentucky have just started working together. Allen is hoping AgrAbility can find ways for him to be more independent in his operation. For starters, John is considering methods to handle getting into and starting the tractor. They also have discussed an automatic hitch to connect the tractor and hay wagons. A squeeze chute would help to automate cattle handing. Allen also hopes to find methods to connect and disconnect hydraulic hoses when he changes equipment.



John Hancock of AgrAbility Kentucky (left) talks to Allen Hicks at Allen's farm in Kentucky.



Allen's tractor loading hay on his Kentucky farm.

Recently fitted with his second prosthesis, Allen started physical therapy sessions three times per week. He says that the toughest part of this incident has been losing some of his independence. "I can operate the baler but can't brush my teeth...go figure." Allen seems confident that, with time and practice, he will be able to handle most, if not all, of his daily living needs. Until that time comes, he stays with his mother and sister who help with daily personal needs.

This farm incident has made him think more about how he works. He hopes telling his story will do the same for others. He is much more conscious of his own safety as well as those who work with or for him. Now he makes sure that he has someone around in case he needs help and he reminds others of safety practices. Even though he works two jobs, he tries to take his time and not make hasty, impulsive decisions that could cause injuries to him or others.

Another realization coming out of his injuries has been awareness of the goodwill of family and friends. He said he hadn't consciously thought about what really good people there were around him. That night in May when his friends and neighbors finished haying for him so that he had one less worry to contend with and many nights thereafter, heightened his understanding of their goodness. ❖

Making and Handling Hay Bales

Farms and ranches with livestock operations rank second highest in the “type of farm” serviced by AgrAbility staff around the country.¹ Certainly managing and understanding animal behavior is very important to prevent serious injuries (for more information on this topic, see the Winter 2002 Quarterly, “Livestock Management,” www.agrabilityproject.org/newsletter/winter_2003/1.cfm). An equally important livestock management topic is animal feed and nutrition needs, especially during the winter or non-growing season. Whether your livestock operation is located in a Great Plains state like South Dakota, a Midwestern state like Iowa, a Southern state like Mississippi, or a Gulf Coast like Florida, the task of making hay for livestock feed in the winter (i.e., non-growing season) and then handling the bales is similar. The length of the growing season may differ, the types of grasses and legumes grown may differ, the methods of hay storage may differ, but making or handling hay is still one of the oldest and most essential tasks of a livestock operation.

While it wasn’t always the case, the majority of hay made across the country today is baled hay. A farm implement called a “hay baler”² is used. Most of the hay is baled in one of three methods: small square/rectangular³ bales, large square/rectangular bales, and large round bales. As with almost all other farm/ranch operations over the past fifty years, continued modernization and increased mechanization has helped to reduce the labor required for making hay (i.e., number of people necessary to make hay). In the early to mid-1900s, making hay was almost a community event on the farm/ranch. The old stationary balers required that hay be brought to the implement,

and operators manually tied the bales with twine or wire after it was fed through the machine. Today, tractor-pulled hay balers with self-feeding pickups, automatic knotters (devices which automatically tie a knot in the wire or twine used to secure the baled hay), and bale throwers which toss the finished bale into wagons are a common sight on farms/ranches through out the United States. For all farmers and ranchers, especially those with any type of physical disability, reducing the manual labor required to make or handle hay bales has been a welcome change.

In the next section, we’ll review the different hay bale types and focus on how small square bales are made and handled, noting some of the devices Allen Hicks uses.

(Note: There are some regions of the country where modern hay making or handling equipment is not used, due to tradition or religious beliefs. Likewise, there are also specialty farms experimenting with smaller round bales [i.e., small enough to be handled manually, similar to the old Allis Chalmers Rotobaler⁴], often used with rotational grazing as winter feed. These small round or “specialty” balers [which are typically manufactured in Europe or Japan], along with those farm/ranch operations not using modern hay making or handling implements, are not being covered in the remainder of this article.) ❖

Making and Handling Hay Bales Has Gotten Easier

Small Square Bales

It has been over 50 years since the first successful automatic pickup, self-tying hay and straw baler first appeared on a farm in Pennsylvania.⁵ This design, later built by New Holland, led to the development of the modern small square hay baler that is still popular in many parts of the country. All of the major and several of the short-line farm equipment manufacturers (equipment manufacturers that only produce a limited type of farm machinery) still produce small square balers. The tractor operator must constantly observe the baler operation and may also need to watch a co-worker's activities on the wagon stacking bales if that hay making method is being used. Most of the small square balers operate to the right side of the tractor and the wagon follows behind the baler usually in line with the tractor. Most small square baling should be done when the hay is below the 22% moisture range to minimize leaf shatter, mold, and heating and allow for safe inside storage, but this can vary somewhat around the country.⁶

Small square balers produce bales that by design are small and light enough for a person to pick up manually, typically ranging from 40 to 60 pounds (depending on the type of hay, the density/size of the bale, and moisture content). The level of physical effort required of the workers (e.g., small square bale handling has traditionally required repetitive lifting and carrying of the bales on the wagon behind the baler, from the wagon to a conveyor/elevator at the storage site and in the storage facility) varies greatly among these baling systems, but some newer equipment greatly eases these physical demands.



At left is a picture of a typical small hay baler being pulled/operated by a farm tractor. In this picture, a flat-bed wagon is being towed behind the baler and a person is manually

stacking the bales as they are made and pushed safely out the bale chamber. Using a similar setup, the baler chamber might be extended even further to allow the bales to free-fall into a bale wagon/buggy, some of which are self-dumping. If a wagon is not towed behind the baler, the bales are allowed to drop on the ground for later pickup. This is perhaps the most physically demanding method to handle the bales, since workers have to lift the small square bales from the ground to a wagon, and also stack the bales on the wagon.

Another, less physically demanding system is to pick bales up from the ground with an automatic bale wagon



(shown at right), pull type or self-propelled. These wagons, which may require the bales be turned on edge when dropped for ease of pickup, gather and stack the bales on the machine, transport the stack to the storage site and unload into the storage while remaining in stack form. No manual lifting of bales is required with this system. An example is built by New Holland: www.newholland.com/na/Products/BaleWag.html. The bale wagon operator will be constantly operating controls and maneuvering the bale wagon to load the bales.



Yet another small bale handling system that greatly reduces the manual handling of bales is an accumulator system attached to the rear of the small square baler (see picture of a small square bale accumulator above). In one example, twelve small square bales are collected and placed in a single layer rectangular

Continued on page 5
October 2003

Assistive Technology Notes

Hay Handling

pattern (www.abcgroff.com/ag/hoel.htm, www.netherexe.com/accumulator.htm).

Placing several bales in a neat arrangement then allows powered “grabbers” and special bale forks to pick up the bales and load them onto a wagon or semi/truck, and later off a wagon or semi/truck for stacking/storage (www.netherexe.com/grabs.htm).



Again no manual lifting of bales is required (see picture above of a special tractor-loader equipped with a grabber loading bales on a wagon).



Finally, if the small square baler is equipped with a bale thrower (sometimes called a “bale ejector”), then the bales are tossed directly into a steel or wooden-sided wagon, essentially baling

and collecting the hay with one pass through the field. This reduces hay handling labor in the field because the thrower tosses the bale directly into the trailing wagon. (See picture at upper left of a small square baler equipped with a bale ejector.)

With bale throwers, bales accumulate on the wagon in a random fashion. The bales must then be manually unloaded from the wagon at the storage site and stacked in storage, which will require the worker to carry and lift the bales. Again the operator must continually observe the baler operation to ensure the thrower/ejector is tossing bales into the trailing wagon. Since the steel or wooden sided wagons are hitched and unhitched to/from the baler frequently, some farmers/ranchers may find an automatic hitching system to be very beneficial (www.agrabilityproject.org/assistivetech/resource/hitches.cfm). These systems permit hitching and unhitching of the wagon without leaving the tractor operator’s seat.

Once at the farm/ranch, storing/stacking small square hay bales might be done in a combination of ways, some of which have been discussed above: manually, using a hay or flat grain elevator/conveyor when stacking at heights too high to reach manually or into a hay loft, or using a bale fork/grabber powered by a skid steer/tractor. Likewise, transporting the bales to feed to livestock, depending upon an operation’s needs, might be done manually (e.g., carry the bale, use a wheelbarrow, etc.) or with the use of a bale cart/cradle (www.hansonsilo.com/haycradle/index.html), a powered cart (e.g., such as those used to haul firewood, etc.), a lawn tractor/wagon, the farm/ranch tractor/truck with wagon/trailer, skid steer/tractor with loader and bale fork/grabber, or utility vehicle/ATV. (See cradle picture on the right.)



Large Round Bales

Large round balers (producing round bales 4 feet in diameter or larger) first began to appear in the mid-1970s. Large round bales with diameters of 4, 5, or 6 feet and widths of 4 or 5 feet can contain between 1000 to 2000 pounds of hay (roughly the equivalent of 20 to 45 small square bales).

Large Square Bales

Large square bales (upwards of 800 pounds) have become very popular across the country in the past 10 years. Again, part of the large square bale attraction is the fact that the farmer/rancher has to handle fewer bales, since a large square bale contains the equivalent of 20 – 40 small square bales. Another big part of the growing popularity of large square bales is the ease of stacking them on semi-trucks, railroad cars, etc., for transport (especially when compared to large round bales). ❖

For more information on both square bale and large round bale handling, please refer to the *Hay Making and Handling Tip Sheet* www.agrabilityproject.org/assistivetech/tips/hayhandling.cfm.

Kentucky AgrAbility Project

Kentucky is a largely rural state. AgrAbility has made a home in the bluegrass under the leadership of John Hancock since 1993. John recognizes the importance of providing resources and reassurance to farmers and rural residents with disabilities, and to that end, Kentucky AgrAbility has provided direct technical assistance to nearly 500 Kentuckians with disabilities since its inception. Kentucky AgrAbility works as a partnership between the Kentucky Cooperative Extension Service and Cardinal Hill Rehabilitation Hospital and serves all 120 counties in the commonwealth.

Services provided by Kentucky AgrAbility include: direct on-farm technical assistance (such as modifying tools, equipment, and machinery); making recommendations to make homes and farm buildings more accessible; facilitating networking among farmers with disabilities to share ideas, experiences, and support; referring individuals to appropriate agencies and organizations that best meet their needs; training rural professionals on rehabilitation technology in agriculture, and; providing awareness resources to Kentuckians so that they call upon Kentucky AgrAbility if needed.

Plowing Into the Future

Kentucky AgrAbility recognizes that technology and the changing landscape of our society mean new challenges and opportunities for rural Kentuckians. Kentucky AgrAbility has strong ties with Kentucky GROW, a three year grant funded by the Rehabilitation Services Administration, in an effort to provide agricultural employment opportunities for people with disabilities. In addition, Kentucky AgrAbility works closely with the Interdisciplinary Human Development Institute at the University of Kentucky to increase awareness of AgrAbility for people with developmental disabilities and their families. ❖

Your Kentucky AgrAbility Project Contact Information

[www.ihdi.uky.edu/agrability/
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From Left to Right: Brett Garrett, Kathy Sheppard-Jones, John Hancock, & Linda Freudenberger

John Hancock, M.S., is the project director of Kentucky AgrAbility with nearly 20 years experience in agriculture and rehabilitation. He is a former Kentucky Cooperative Extension Service agent and brings a vast knowledge of agricultural resources and technology to AgrAbility. When he isn't working one-on-one with farmers around the state, he can be found on his own land in Mercer county, usually tinkering with some gadget that just might make a job easier for one of the farmers with whom he works.

Linda Freudenberger, OTR/L, works with John at farm site visits, providing valuable perspective on ergonomics and compensatory strategies to help clients find new techniques to accomplish tasks. Linda also provides pre-service training to up and coming professionals in the field. She works at Cardinal Hill Rehabilitation Hospital. This enables Kentucky AgrAbility to become involved in the rehabilitation process for a rural resident who has become injured or ill, sometimes even before that person returns home.

Kathy Sheppard-Jones, PhD, CRC, oversees training opportunities and resource development for Kentucky AgrAbility. She coordinates the yearly Kentucky AgrAbility conference, produces newsletters, fact sheets, and other resource materials, and seeks ways to spread the word about Kentucky AgrAbility services. She conducts quality of life research and teaches at the University of Kentucky. In her free time, Kathy trains and shows Morgan horses.

Brent Garrett, PhD, has come on board Kentucky AgrAbility to help provide ongoing evaluation of the project's activities. He is the "data guy" who helps determine what we are doing well and what needs are present in Kentucky that we might be able to better meet. Brent oversees several evaluation endeavors at the Interdisciplinary Human Development Institute and teaches at the University of Kentucky.

Other important collaborators:

Barney Fleming, rehabilitation engineer, often travels with John around the state to provide additional insight when rehabilitation technology may be needed. John and Barney recently presented at the national Association for Driver Rehabilitation Specialists (ADED) conference on agricultural modifications for field and forest.

Matt John, M.S., often works with Kentucky AgrAbility in his capacity as project director of Kentucky GROW. Matt is a former Cooperative Extension Service agent who assists individuals with disabilities who are considering self-employment in agriculture.

References

References

- ¹. AgrAbility client data from 2001 – 2002
- ². “Hay Baler”: farm machine that packs and ties (or wraps in plastic) field-dried hay into bundles, called bales, for convenient handling, storage, and shipping. It ordinarily picks up hay that has been raked into rows and packs and ties it into round or square/rectangular bales to be picked up. Some modern balers include automatic stacking or loading devices. Very large bales are often stored in the field and moved with front-end loaders. Nearly all hay in the United States is baled. Bibliography: See C. Culpin, *Farm Machinery* (12th ed. 1992).
- ³. Square hay bales are not really “square,” they are “rectangular,” but it is more common to refer to square bales than “rectangular” bales, so for the purposes of this article we’ll stick with the more common term.
- ⁴. Plough Books - books with history and operating instructions for older Allis Chalmers farm tractors and equipment, if readers would like to familiarize themselves – can be found at www.ploughbooksales.com.au/35.htm
- ⁵. American Society of Agricultural Engineers (ASAE), ASAE Historic Agricultural Engineering Landmarks, #11, World’s First Successful Automatic Pickup, Self-Tying Hay and Straw Baler, www.asae.org/awards/historic2/summary.html
- ⁶. Nutritive Value of Hay is Critical – Press Release, 2002, Samuel Roberts Noble Foundation, www.noble.org/

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The **AgrAbility Project** promotes success in agriculture for individuals with disabilities and their families through on-site assistance and educational resources. For additional information on the **National AgrAbility Project** or for a current list of state project sites, addresses and telephone numbers contact:

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